PKE8720DF-A00-F10 Board

Specification

Rev. 1.0

Nov. 16, 2022

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This document is intended for the software engineer's reference and provides detailed programming information.

Though every effort has been made to ensure that this document is current and accurate, more information may have become available subsequent to the production of this guide.

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Contents

1 Product Overview

1.1 General Description

The PKE8720DF-A00-F10 development board is designed by Pankore for the PKM8720DF-A00-F10 module. All the module's GPIOs are pin out for the developers to develop and debug the module conveniently. Standard pin headers on both sides can also make operation easier when using bread boards for development and commissioning.

The PKM8720DF-A00-F10 is a multi-radio MCU Module. With the open CPU architecture, customers can develop advanced applications running on the dual-core 32-bit MCU. The radio provides support for Wi-Fi 802.11 a/b/g/n in the 2.4GHz/5GHz band and BLE 5.0 communications. The rich set of peripherals and high performance make it an ideal choice for smart homes, industrial automation, consumer electronics, etc.

The block diagram of PKM8720DF-A00-F10 module is illustrated in Figure 1.

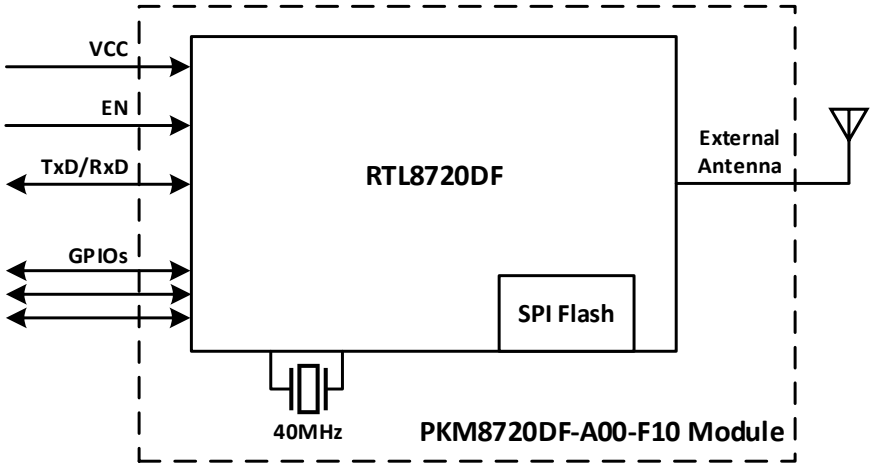


Figure 1. PKM8720DF-A00-F10 Module Block Diagram

1.2 Characteristics

- Support 802.11 a/b/g/n 1x1, 2.4GHz & 5GHz
- Support 20MHz/40MHz bandwidth, up to the data rate of MCS7
- Support low power beacons listen mode, low power Rx mode, and low power suspends mode(DLPS)
- Built-in AES/DES/SHA hardware engine
- Support Arm TrustZone-M and secure boot
- Support SWD debug port access protection and prohibition modes
- Support BLE 5.0, both central and peripheral modes
- Support Bluetooth high-power mode (maximum 10dBm)
- Internal co-existence mechanism between Wi-Fi and BT to share the same antenna
- KM4 and KM0 both have a GDMA controller, each with 6 channels

1.3 Application Solution

- Smart Homes
- Health and Fitness
- Portable Devices
- Medical
- Industrial

1.4 Main Parameters

Table 1. PKM8720DF-A00-F10 Module Main Parameters

Parameter	Description
Module Name	PKM8720DF-A00-F10
Module Package	LGA-44
Module Size	12 ± 0.2mm (L) x 12 ± 0.2mm (W) x 2.5 ± 0.1mm (H)
Antenna	External Antenna
Wi-Fi Frequency Range	● 2412MHz ~ 2484MHz (2.4GHz ISM Band) ● 5180MHz ~ 5825MHz (5GHz)
Bluetooth	BLE 5.0
Bluetooth Frequency Range	2402MHz ~ 2480MHz
Operating Temperature	-20°C to 85°C
Store Environment	-40°C to 125°C, < 90% RH
Power supply Range	(3.3 ± 10%)V, current > 450mA
Interface	UART/GPIO/ADC/PWM/I2C/SPI/SWD/USB 2.0 HS/SDIO
Module Certification	RoHS FCC/CE/SRRC

2 Electrical Characteristics

Table 2. PKM8720DF-A00-F10 module Electrical Characteristics

Parameter condition	Min.	Typ.	Max.	Unit
DC 3.3V Supply Voltage	3.0	3.3	3.6	V
Digital I/O Supply Voltage	1.76	1.8~3..3	3.6	V
DC 3.3 Rating Current (with internal regulator and integrated CMOS PA)	-	-	450	mA
3.3V I/O Rating Current	-	-	50	mA
Electrostatic protection	-	-	2000	V

NOTE

The PKM8720DF-A00-F10 module is electrostatic sensitive devices (ESD) and requires special ESD precautions typically applied to ESD sensitive components. Proper ESD handling and packaging procedures must be applied throughout the processing, handling, transportation and operation of any application that incorporates the PKM8720DF-A00-F10 module. Do not touch the module by hand or solder with non-anti-static soldering iron to avoid damage to the module.

3 RF Performance

3.1 Wi-Fi 2.4GHz Band RF Specification

Table 3. Wi-Fi 2.4GHz Transmitter Performance Specification

Parameter	Condition	Min.	Typ.	Max.	Unit
Frequency Range	-	2412	-	2484	MHz
Tx power at the antenna port for the highest power level (25°C)	1 Mbps DSSS	-	20	-	dBm
	11 Mbps DSSS	-	18	-	dBm
	6 Mbps OFDM	-	19	-	dBm
	54 Mbps OFDM	-	17	-	dBm
	HT20 MCS0	-	18	-	dBm
	HT20 MCS7	-	16	-	dBm
	HT40 MCS0	-	18	-	dBm
	HT40 MCS7	-	16	-	dBm
Tx EVM	1 Mbps DSSS	-	8	-	%
	11 Mbps DSSS	-	8	-	%
	6 Mbps OFDM	-	-5	-	dB
	54 Mbps OFDM	-	-25	-	dB
	HT20 MCS0	-	-5	-	dB
	HT20 MCS7	-	-28	-	dB
	HT40 MCS0	-	-5	-	dB
	HT40 MCS7	-	-28	-	dB

Table 4. Wi-Fi 2.4GHz Receiver Performance Specification

Parameter	Condition	Min.	Typ.	Max.	Unit
Frequency Range	-	2412	-	2484	MHz
802.11b Rx Sensitivity (8% PER)	1 Mbps DSSS	-	-96	-	dBm
	11 Mbps DSSS	-	-89	-	dBm
802.11g Rx Sensitivity (10% PER)	6 Mbps OFDM	-	-93	-	dBm
	54 Mbps OFDM	-	-75	-	dBm
802.11n Rx Sensitivity (10% PER)	HT20 MCS0	-	-93	-	dBm
	HT20 MCS7	-	-73	-	dBm
	HT40 MCS0	-	-91	-	dBm
	HT40 MCS7	-	-70	-	dBm

3.2 Wi-Fi 5GHz Band RF Specification

Table 5. Wi-Fi 5GHz Transmitter Performance Specification

Parameter	Condition	Min.	Typ.	Max.	Unit
Frequency Range	-	5180	-	5825	MHz
Tx power at the antenna port for the highest power level (25°C)	6 Mbps OFDM	-	17	-	dBm
	54 Mbps OFDM	-	13	-	dBm
	HT20 MCS0	-	15	-	dBm
	HT20 MCS7	-	12	-	dBm
	HT40 MCS0	-	15	-	dBm
	HT40 MCS7	-	12	-	dBm
Tx EVM	6 Mbps OFDM	-	-5	-	dB
	54 Mbps OFDM	-	-25	-	dB
	HT20 MCS0	-	-5	-	dB
	HT20 MCS7	-	-28	-	dB
	HT40 MCS0	-	-5	-	dB
	HT40 MCS7	-	-28	-	dB

Table 6. Wi-Fi 5GHz Receiver Performance Specification

Parameter	Condition	Min.	Typ.	Max.	Unit
Frequency Range	-	5180	-	5825	MHz
802.11g Rx Sensitivity (10% PER)	6 Mbps OFDM	-	-91	-	dBm
	54 Mbps OFDM	-	-74	-	dBm
802.11n Rx Sensitivity (10% PER)	HT20 MCS0	-	-91	-	dBm
	HT20 MCS7	-	-72	-	dBm
	HT40 MCS0	-	-89	-	dBm
	HT40 MCS7	-	-69	-	dBm

3.3 Bluetooth LE RF Specification

Table 7. Bluetooth LE Transmitter Performance Specification

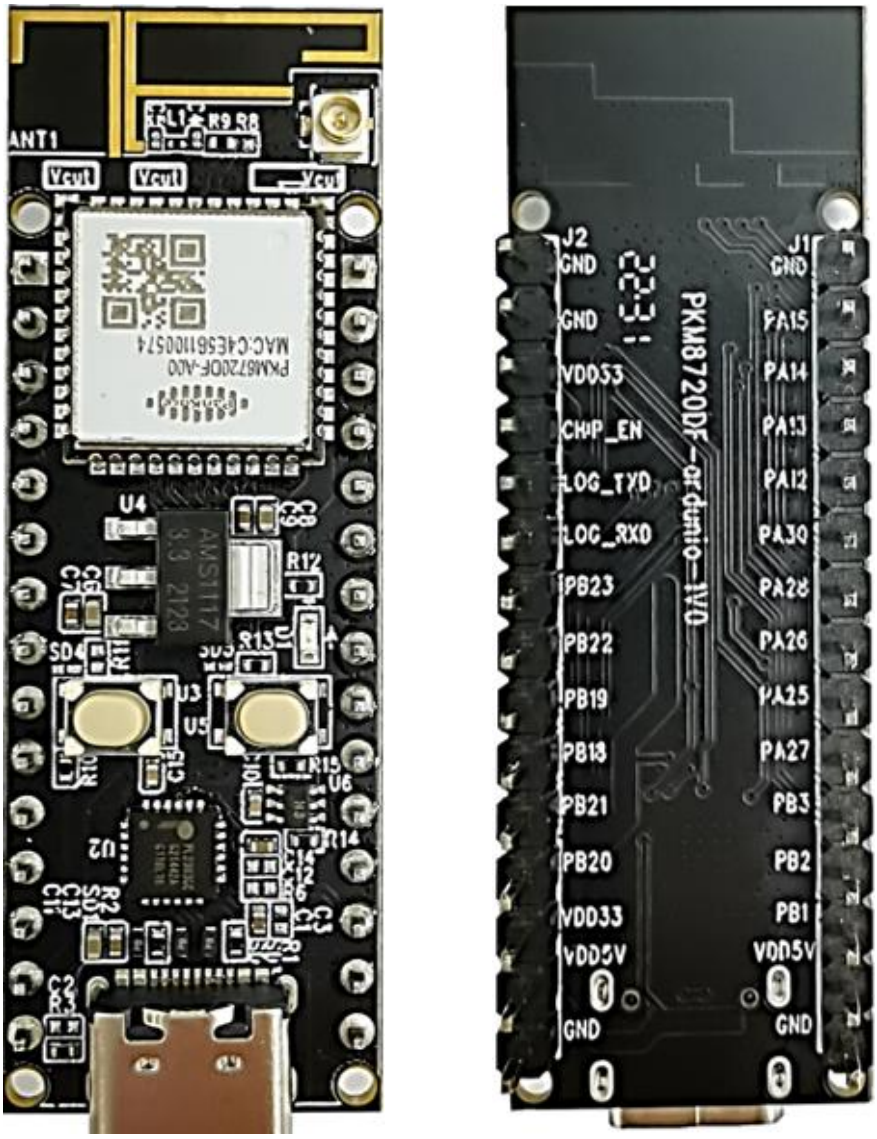
Parameter	Condition	Min.	Typ.	Max.	Unit
Frequency Range	-	2402	-	2480	MHz
Tx Output Power	LE1M	-10	4.5	10	dBm
	LE2M				

Table 8. Bluetooth LE Receiver Performance Specification

Parameter	Condition	Min.	Typ.	Max.	Unit
Frequency Range	-	2402	-	2480	MHz
Rx Sensitivity @30.8% PER	LE1M	-	-99	-	dBm
	LE2M	-	-95	-	

4 Appearance Dimensions

Board dimension: 51.8 ± 0.2mm (L) x 17.8 ± 0.2mm (W) x 3.5 ± 0.2mm (H)



Top View Bottom View

Figure 2. PKE8720DF-A00-F10 Board Appearance

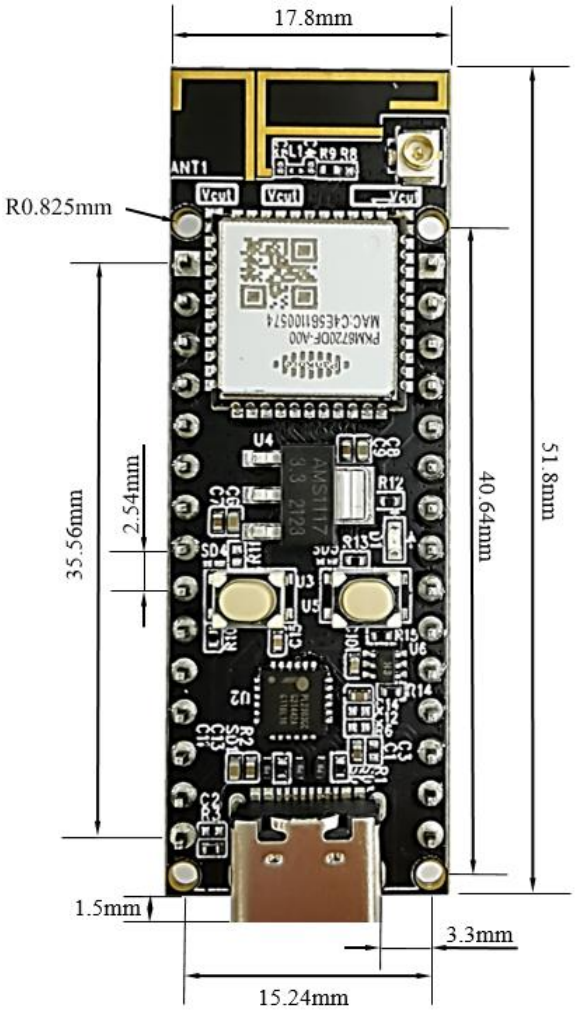


Figure 3. PKE8720DF-A00-F10 Board Dimensions

5 LED and Keys

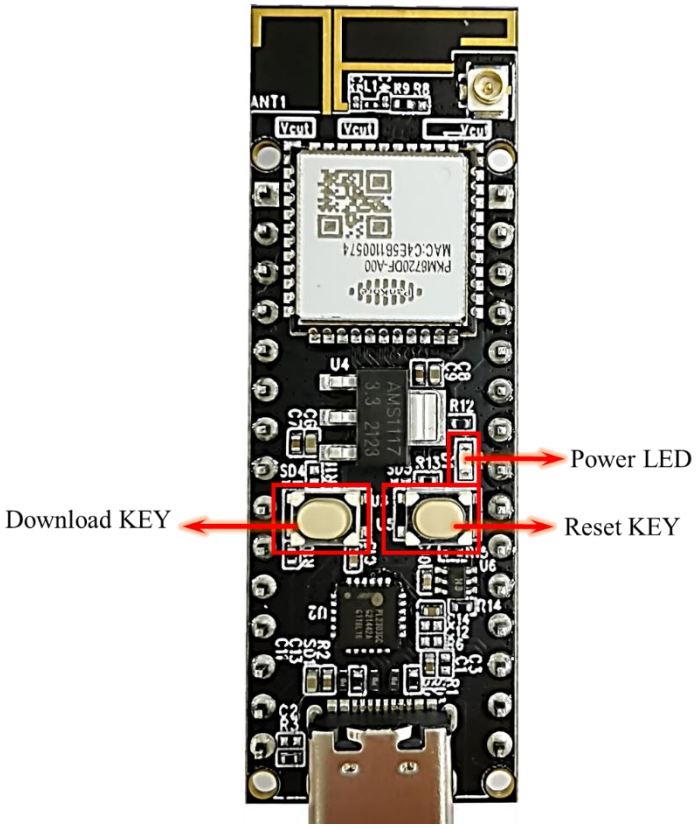


Figure 4. LED and Keys

Table 9. Information of LED and Keys

LED & Keys	Function	Note
Power LED	3.3 V power light	LED lights up when 3.3v is available.
Reset KEY	Reset button	-
Download KEY	Set the module to download mode	Follow these steps to enter the download mode: (1) Press and hold the Download KEY (2) Press the Reset KEY and release it (3) Release the Download KEY

6 Pin Definition

The PKE8720DF-A00-F10 development board leads out 30 interfaces, you can refer to the board interface description, and the pin function definition table is also layout to describe the interface definition.

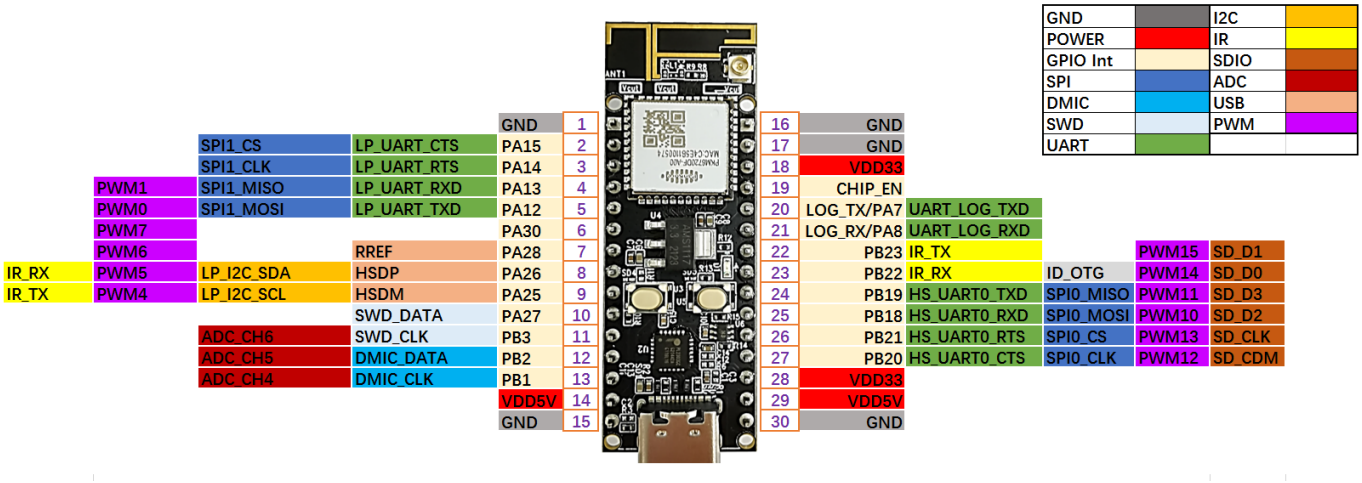


Figure 5. PKE8720DF-A00-F10 Board Interface Description

Table 10. PKE8720DF-A00-F10 Board Pin Definition

Pin No.	Pin Name	Description
1	GND	Ground
2	PA15	LP_UART_CTS/SPI1_CS
3	PA14	LP_UART_RTS/SPI1_CLK
4	PA13	LP_UART_RXD/SPI1_MISO/PWM1
5	PA12	LP_UART_TXD/SPI1_MOSI/PWM0
6	PA30	PWM7
7	PA28	RREF/PWM6
8	PA26	HSDP/LP_I2C_SDA/PWM5/IR_RX
9	PA25	HSDM/LP_I2C_SCL/PWM4/IR_TX
10	PA27	SWD_DATA
11	PB3	SWD_CLK/ADC_CH6
12	PB2	DMIC_DATA/ADC_CH5
13	PB1	DMIC_CLK/ADC_CH4
14	VDD5V	5V power supply (VDD)
15	GND	Ground
16	GND	Ground
17	GND	Ground
18	VDD33	3.3V power supply (VDD)
19	CHIP_EN	Chip enabling terminal
20	LOG_TX/PA7	UART_LOG_TXD
21	LOG_RX/PA8	UART_LOG_RXD
22	PB23	IR_TX/PWM15/SD_D1
23	PB22	IR_RX/ID_OTG/PWM14/SD_D0
24	PB19	HS_UART0_TXD/SPI0_MISO/PWM11/SD_D3
25	PB18	HS_UART0_RXD/SPI0_MOSI/PWM10/SD_D2
26	PB21	HS_UART0_RTS/SPI0_CS/PWM13/SD_CLK
27	PB20	HS_UART0_CTS/SPI0_CLK/PWM12/SD_CDM
28	VDD33	3.3V power supply (VDD)
29	VDD5V	5V power supply (VDD)
30	GND	Ground

NOTE

If user wants to use the USB function, RREF needs to be connected to a resistor (12kohm, 1%) in series to the ground. Then, the USB function can be used normally after reboot.

7 Schematic Diagram

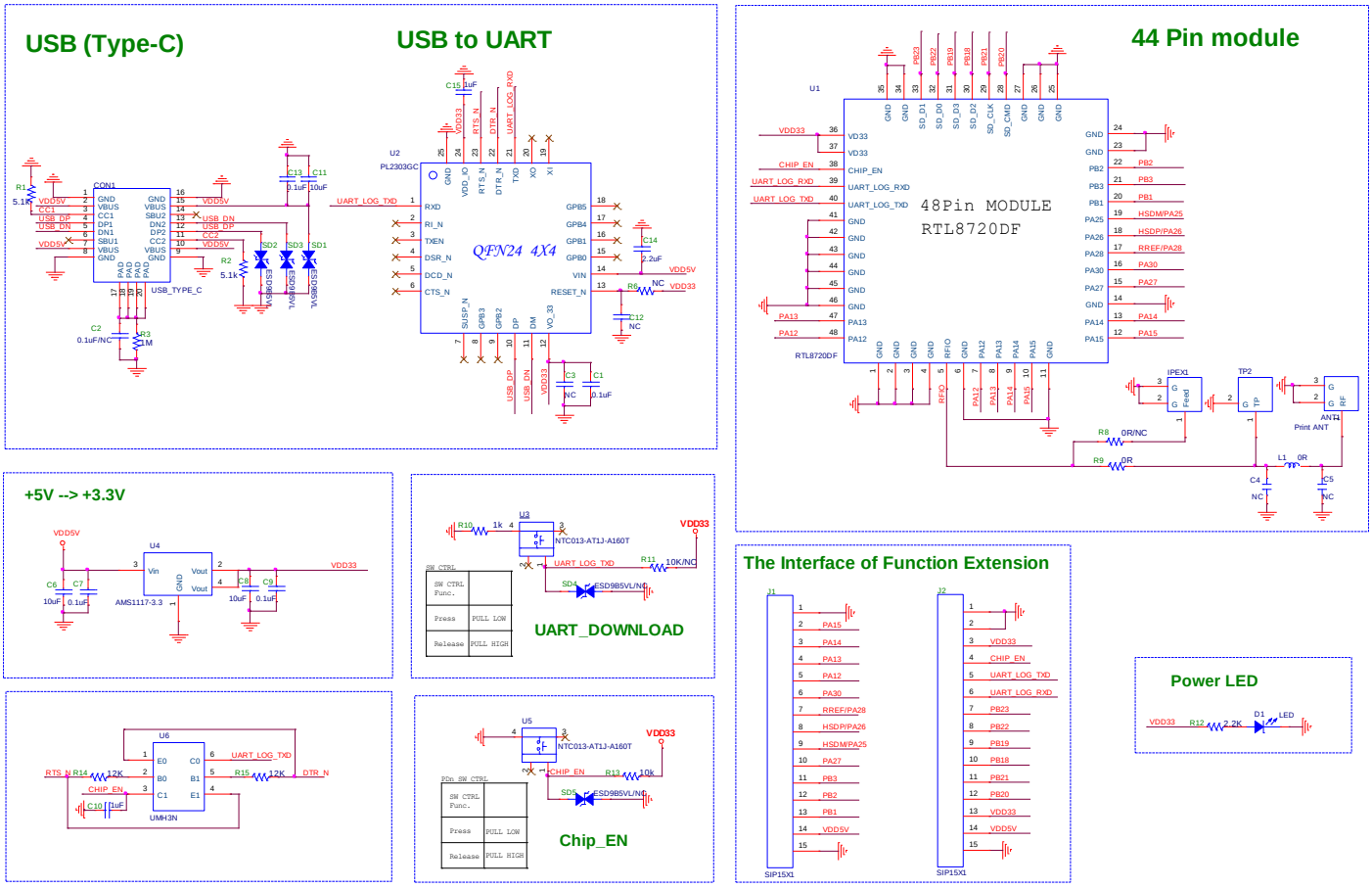


Figure 6. PKE8720DF-A00-F10 Schematic Diagram

8 Package Information

The PKE8720DF-A00-F10 development board is packaged for inserted pearl cotton with electrostatic bags.

Revision History

Data	Revision	Summary
2022-11-16	1.0	Initial release